CLAIMS

1. A radio-frequency (RF) repeater, comprising:

a first repeating section, which is adapted to receive and amplify forward-signals from a first transceiver so as to generate amplified-forward-signals and to radiate the amplified-forward-signals to a second transceiver, and to receive and amplify reverse-main-signals from the second transceiver so as to generate amplified-reverse-main-signals and to transmit the amplified-reverse-main-signals to the first transceiver; and

a second repeating section, which is adapted to receive and amplify reverse-diversity-signals from the second transceiver so as to generate amplified-reverse-diversity-signals and to transmit the amplified-reverse-diversity-signals to the first transceiver.

2. A repeater according to claim 1, and comprising a housing which contains the first and second repeating sections.

3. A repeater according to claim 1, wherein the forward-signals are not received by the second transceiver, and the reverse-main-signals and the reverse-diversity-signals are not received by the first transceiver.

4. A repeater according to claim 1, wherein the reverse-main-signals and the reverse-diversity-signals are generated from a reverse-signal transmitted from the second transceiver.

5. A repeater according to claim 1, wherein the first repeating section comprises a first antenna which receives the reverse-main-signals, and wherein the second repeating section comprises a second antenna which receives the reverse-diversity-signals.

6. A repeater according to claim 5, wherein the first and second antennas are separated by a distance within a range of 1 - 6 wavelengths of the reverse-main-signals and the reverse-diversity-signals.

7. A repeater according to claim 5, wherein the first and second antennas are adapted to receive differently polarized signals.

8. A repeater according to claim 1, wherein the first and the second repeating sections are adapted to introduce a time differential between the reverse-main-signals and the reverse-diversity-signals.

9. A radio-frequency (RF) repeater system, comprising:

a first repeater unit, which is adapted to receive and amplify forward-signals from a first transceiver so as to generate amplified-forward-signals;

cabling, which is adapted to receive and convey the amplified-forward-signals from the first repeater unit; and

a second repeater unit, which is adapted to receive the amplified-forward-signals from the cabling and to further amplify the amplified-forward-signals so as to generate resultant-forward-signals and to radiate the resultant-forward-signals to a second transceiver, and which is adapted to receive and amplify reverse-main-signals and reverse-diversity-signals from the second transceiver so as to generate respectively amplified-reverse-main-signals and amplified-reverse-diversity-signals and to convey the amplified-reverse-main-signals and the amplified-reverse-diversity-signals to the first repeater unit via the cabling, and wherein the first repeater unit is adapted to further amplify the amplified-reverse-main-signals and amplified-reverse-diversity-signals so as to generate respective resultant-reverse-main-signals and resultant-reverse-diversity-signals and to transmit the resultant-reverse-main-signals and the resultant-reverse-diversity-signals to the first transceiver.

10. A repeater according to claim 9, wherein the forward-signals are not received

by the second transceiver, and the reverse-main-signals and the reverse-diversity-signals are not received by the first transceiver.

11. A repeater according to claim 9, wherein the reverse-main-signals and the reverse-diversity-signals are generated from a reverse-signal transmitted from the second transceiver.

12. A repeater according to claim 9, wherein the second repeater unit comprises a first antenna which receives the reverse-main-signals and a second antenna which receives the reverse-diversity-signals.

13. A repeater according to claim 12, wherein the first and second antennas are separated by a distance within a range of 1 - 6 wavelengths of the reverse-main-signals and the reverse-diversity-signals.

14. A repeater according to claim 12, wherein the first and second antennas are adapted to receive differently polarized signals.

15. A repeater according to claim 9, wherein at least one of the first and the second repeater units is adapted to introduce a time differential between the reverse-main-signals and the reverse-diversity-signals.

16. A repeater according to claim 9, wherein the cabling comprises a first cable which conveys the amplified-forward-signals and the amplified-reverse-main-signals, and a second cable which conveys the amplified-reverse-diversity-signals.

17. A repeater according to claim 9, wherein the first repeater unit comprises a power supply which supplies power to the first repeater unit and to the second repeater unit via the cabling.

18. A repeater according to claim 9, wherein the first repeater unit comprises a monitor which monitors a condition of the first repeater unit and of the second repeater unit via the cabling.

19. A repeater according to claim 9, wherein the first repeater unit comprises a first forward-signal-converter adapted to generate the amplified-forward-signals as converted-frequency-forward-signals, and the second repeater unit comprises a second forward-signal-converter adapted to generate the resultant-forward-signals from the converted-frequency-forward-signals.

20. A repeater according to claim 19, wherein the first forward-signal-converter comprises a first mixer which receives an indication of a local oscillator (LO) frequency and generates the converted-frequency-forward-signals as intermediate-frequency-forward-signals (IF-forward-signals) having a frequency less than the forward-signals responsive to the indication, and wherein the second forward-signal-converter comprises a second mixer which receives the indication of the LO frequency and the IF-forward-signals and generates the resultant-forward-signals responsive thereto.

21. A repeater according to claim 19, wherein the first forward-signal-converter comprises an optical emitter which generates a modulated-optical-carrier responsive to the forward-signals, the second forward-signal-converter comprises an optical detector which receives the modulated-optical-carrier and generates the resultant-forward-signals therefrom, and wherein the cabling comprises a fiber optic cable.

22. A repeater according to claim 9, wherein the second repeater unit comprises:

a first reverse-signal-converter adapted to generate the amplified-reverse-main-signals as converted-frequency-reverse-main-signals; and

a second reverse-signal-converter adapted to generate the amplified-reverse-diversity-signals as converted-frequency-reverse-diversity-signals,

and wherein the first repeater unit comprises:

a third reverse-signal-converter adapted to generate the resultant-reverse-main-signals from the converted-frequency-reverse-main–signals; and

a fourth reverse-signal-converter adapted to generate the resultant-reverse-diversity-signals from the converted-frequency-reverse-diversity–signals.

23. A repeater according to claim 22, wherein the converted-frequency-reverse-diversity-signals comprise a different frequency from the converted-frequency-reverse-main-signals.

24. A repeater according to claim 22, wherein the first reverse-signal-converter comprises a first mixer which receives an indication of a first local oscillator (LO) frequency and generates the converted-frequency-reverse-main-signals as intermediate-frequency-reverse-main-signals (IF-reverse-main-signals) having a frequency less than the reverse-main-signals responsive thereto, and wherein the third reverse-signal-converter comprises a second mixer which receives the indication of the first LO frequency and the IF-reverse-main-signals and generates the resultant-reverse-main-signals responsive thereto.

25. A repeater according to claim 24, wherein the second reverse-signal-converter comprises a third mixer which receives an indication of a second LO frequency and generates the converted-frequency-reverse-diversity-signals as intermediate-frequency-reverse-diversity-signals (IF-reverse-diversity-signals) having a frequency less than the reverse-diversity-signals responsive thereto, and wherein the fourth reverse-signal-converter comprises a fourth mixer which receives the indication of the second LO frequency and the IF-reverse-diversity-signals and generates the resultant-reverse-diversity-signals responsive thereto.

26. A repeater according to claim 25, wherein the second LO frequency and the first LO frequency are different.

27. A repeater according to claim 22, wherein the first reverse-signal-converter comprises a first optical emitter which generates a first modulated-optical-carrier responsive to the reverse-main-signals, and wherein the third reverse-signal-converter comprises a first optical detector which receives the first modulated-optical-carrier and generates the resultant-reverse-main-signals therefrom, and wherein the cabling comprises a fiber optic cable.

28. A repeater according to claim 27, wherein the second reverse-signal-converter comprises a second optical emitter which generates a second modulated-optical-carrier responsive to the reverse-diversity-signals, and wherein the fourth reverse-signal-converter comprises a second optical detector which receives the second modulated-optical-carrier and generates the resultant-reverse-diversity-signals therefrom.

29. A repeater according to claim 28, wherein the second modulated-optical-carrier comprises a second modulated-optical-carrier frequency different in value from a first modulated-optical-carrier frequency of the first modulated-optical-carrier.

30. A method for repeating radio-frequency (RF) signals, comprising:

receiving in a first repeating section forward-signals from a first transceiver;

amplifying the forward-signals in the first repeating section so as to generate amplified-forward-signals;

radiating the amplified-forward-signals from the first repeating section to a second transceiver;

receiving in the first repeating section reverse-main-signals from the second transceiver;

amplifying the reverse-main-signals in the first repeating section so as to generate amplified-reverse-main-signals;

transmitting the amplified-reverse-main-signals from the first repeating section to the first transceiver;

receiving in a second repeating section reverse-diversity-signals from the second transceiver;

amplifying the reverse-diversity-signals in the second repeating section so as to generate amplified-reverse-diversity-signals; and

transmitting the amplified-reverse-diversity-signals from the second repeating section to the first transceiver.

31. A method according to claim 30, and comprising enclosing the first and the second repeating sections in a common housing.

32. A method according to claim 30, wherein the forward-signals are not received by the second transceiver, and the reverse-main-signals and the reverse-diversity-signals are not received by the first transceiver.

33. A method according to claim 30, and comprising transmitting a reverse-signal from the second transceiver and wherein receiving in the first repeating section the reverse-main-signals comprises generating the reverse-main-signals responsive to the reverse-signal, and wherein receiving in the second repeating section the reverse-diversity-signals comprises generating the reverse-diversity-signals responsive to the reverse-signal.

34. A method according to claim 30, and comprising receiving the reverse-main-signals in a first antenna comprised in the first repeating section, and receiving the reverse-diversity-signals in a second antenna comprised in the second repeating section.

35. A method according to claim 34, wherein the first and second antennas are separated by a distance within a range of 1 - 6 wavelengths of the reverse-main-signals and the reverse-diversity-signals.

36. A method according to claim 34, wherein the first and second antennas are adapted to receive differently polarized signals.

37. A method according to claim 30, and comprising introducing a time delay between the reverse-main-signals and the reverse-diversity-signals.

38. A method for repeating radio-frequency (RF) signals, comprising:

receiving forward-signals from a first transceiver;

amplifying the forward-signals in a first repeater unit so as to generate amplified-forward-signals;

conveying the amplified-forward-signals to a second repeater unit;

further amplifying the amplified-forward-signals in the second repeater unit so as to generate resultant-forward-signals;

radiating the resultant-forward-signals to a second transceiver;

receiving reverse-main-signals and reverse-diversity-signals from the second transceiver;

amplifying the reverse-main-signals and the reverse-diversity-signals in the second repeater unit so as to generate respectively amplified-reverse-main-signals and amplified-reverse-diversity-signals;

conveying the amplified-reverse-main-signals and the amplified-reverse-diversity-signals to the first repeater unit;

further amplifying the amplified-reverse-main-signals and amplified-reverse-diversity-signals in the first repeater unit so as to generate respectively resultant-reverse-main-signals and resultant-reverse-diversity-signals; and

transmitting the resultant-reverse-main-signals and the resultant-reverse-diversity-signals to the first transceiver.

39. A method according to claim 38, wherein conveying the amplified-forward-signals comprises conveying the amplified-forward-signals via cabling.

40. A method according to claim 38, wherein the forward-signals are not received by the second transceiver, and the reverse-main-signals and the reverse-diversity-signals are not received by the first transceiver.

41. A method according to claim 38, wherein receiving the reverse-main-signals and the reverse-diversity-signals from the second transceiver comprises transmitting a reverse-signal from the second transceiver and generating the reverse-main-signals and the reverse-diversity-signals responsive to the reverse-signal.

42. A method according to claim 38, wherein receiving the reverse-main-signals and the reverse-diversity-signals comprises receiving the reverse-main-signals in a first antenna and receiving the reverse-diversity-signals in a second antenna.

43. A method according to claim 42, wherein the first and second antennas are separated by a distance within a range of 1 - 6 wavelengths of the reverse-main-signals and the reverse-diversity-signals.

44. A method according to claim 42, wherein the first and second antennas are adapted to receive differently polarized signals.

45. A method according to claim 38, and comprising introducing a time delay between the reverse-main-signals and the reverse-diversity-signals.

46. A method according to claim 38, wherein conveying the amplified-forward-signals comprises conveying the amplified-forward-signals via a first cable, and wherein receiving the reverse-main-signals and the reverse-diversity-signals comprises conveying the reverse-main-signals via the first cable and conveying the reverse-diversity-signals via a second cable.

47. A method according to claim 38, wherein amplifying the forward-signals comprises converting a frequency of the forward-signals to generate the amplified-forward-signals as converted-frequency-forward-signals, and wherein further amplifying the amplified-forward-signals comprises generating the resultant-forward-signals from the converted-frequency-forward-signals.

48. A method according to claim 47, wherein converting the frequency of the forward-signals comprises mixing the forward-signals in a first mixer with a local oscillator (LO) frequency and generating the converted-frequency-forward-signals as intermediate-frequency-forward-signals (IF-forward-signals) having a frequency less than the forward-signals, and wherein further amplifying the amplified-forward-signals comprises mixing the IF-forward-signals with the LO frequency and the IF-forward-signals in a second mixer and generating the resultant-forward-signals therefrom.

49. A method according to claim 47, wherein converting the frequency of the forward-signals comprises modulating an optical carrier to generate a modulated-optical-carrier responsive to the forward-signals, and conveying the modulated-optical-carrier from the first repeater unit to the second repeater unit via a fiber optic cable, and generating the resultant-forward-signals comprises detecting the modulated-optical-carrier.

50. A method according to claim 38, and comprising:

generating in a first reverse-signal-converter comprised in the second repeater unit the amplified-reverse-main-signals as converted-frequency-reverse-main-signals;

generating in a second reverse-signal-converter comprised in the second repeater unit the amplified-reverse-diversity-signals as converted-frequency-reverse-diversity-signals;

generating in a third reverse-signal-converter comprised in the first repeater unit the resultant-reverse-main-signals from the converted-frequency-reverse-main–

signals; and

generating in a fourth reverse-signal-converter comprised in the first repeater unit the resultant-reverse-diversity-signals from the converted-frequency-reverse-diversity–signals.

51. A method according to claim 50, wherein the converted-frequency-reverse-diversity-signals comprise a different frequency from the converted-frequency-reverse-main-signals.

52. A method according to claim 50, wherein generating in the first reverse-signal-converter comprises mixing a first local oscillator (LO) frequency with the reverse-main-signals so as to generate the converted-frequency-reverse-main-signals as intermediate-frequency-reverse-main-signals (IF-reverse-main-signals) having a frequency less than the reverse-main-signals, and generating in the third reverse-signal-converter comprises mixing the first LO frequency and the IF-reverse-main-signals so as to generate the resultant-reverse-main-signals therefrom.

53. A method according to claim 52, wherein generating in the second reverse-signal-converter comprises mixing a second LO frequency different from the first LO frequency with the reverse-diversity-signals so as to generate the converted-frequency-reverse-diversity-signals as intermediate-frequency-reverse-diversity-signals (IF-reverse-diversity-signals) having a frequency less than the reverse-diversity-signals, and wherein generating in the fourth reverse-signal-converter comprises mixing the second LO frequency and the IF-reverse-diversity-signals so as to generate the resultant-reverse-diversity-signals therefrom.

54. A method according to claim 50, wherein generating in the first reverse-signal-converter comprises modulating a first optical emitter with the reverse-main-signals so as to produce a first modulated-optical-carrier and conveying the first modulated-optical-carrier from the second repeater unit to the first repeater unit via a

fiber optic cable, and wherein generating in the third reverse-signal-converter comprises detecting the first modulated-optical-carrier and generating the resultant-reverse-main-signals therefrom.

55. A method according to claim 54, wherein generating in the second reverse-signal-converter comprises modulating a second optical emitter with the reverse-diversity-signals so as to produce a second modulated-optical-carrier, and conveying the first modulated-optical-carrier from the second repeater unit to the first repeater unit via the fiber optic cable, and wherein generating in the fourth reverse-signal-converter comprises detecting in a second optical detector the second modulated-optical-carrier and generating the resultant-reverse-diversity-signals therefrom.

56. A radio-frequency (RF) repeater system, comprising:

a first repeater unit, which is adapted to receive and amplify forward-signals from a first transceiver so as to generate amplified-forward-signals;

cabling, which is adapted to receive and convey the amplified-forward-signals from the first repeater unit; and

a plurality of second repeater units, each of which is adapted to receive the amplified-forward-signals from the cabling and to further amplify the amplified-forward-signals so as to generate resultant-forward-signals and to radiate the resultant-forward-signals to a second transceiver, and which is adapted to receive and amplify reverse-main-signals and reverse-diversity-signals from the second transceiver so as to generate respectively amplified-reverse-main-signals and amplified-reverse-diversity-signals and to convey the amplified-reverse-main-signals and the amplified-reverse-diversity-signals to the first repeater unit via the cabling, and wherein the first repeater unit is adapted to further amplify the amplified-reverse-main-signals and amplified-reverse-diversity-signals so as to generate respective resultant-reverse-main-signals and resultant-reverse-diversity-signals and to transmit the resultant-reverse-main-signals and the resultant-reverse-diversity-signals to the first transceiver.

57. A method for repeating radio-frequency (RF) signals, comprising:

receiving forward-signals from a first transceiver;

amplifying the forward-signals in a first repeater unit so as to generate amplified-forward-signals;

conveying the amplified-forward-signals to a plurality of second repeater units;

further amplifying the amplified-forward-signals in the plurality of second repeater units so as to generate resultant-forward-signals;

radiating the resultant-forward-signals to a second transceiver;

receiving reverse-main-signals and reverse-diversity-signals from the second transceiver;

amplifying the reverse-main-signals and the reverse-diversity-signals in the plurality of second repeater units so as to generate respectively amplified-reverse-main-signals and amplified-reverse-diversity-signals;

conveying the amplified-reverse-main-signals and the amplified-reverse-diversity-signals to the first repeater unit;

further amplifying the amplified-reverse-main-signals and amplified-reverse-diversity-signals in the first repeater unit so as to generate respectively resultant-reverse-main-signals and resultant-reverse-diversity-signals; and

transmitting the resultant-reverse-main-signals and the resultant-reverse-diversity-signals to the first transceiver.

58. A method according to claim 57, wherein conveying the amplified-forward-signals comprises conveying the amplified-forward-signals via cabling.